U.S. Department
of Transportation
**Federal Aviation
Administration**

800 Independence Ave., S.W.
Washington, D.C. 20591

August 4, 2015

Exemption No. 12315
Regulatory Docket No. FAA–2015–1710

Mr. Nathan W. Richards
AirFrame LLC
5776 Haleola Street
Honolulu, HI 96821

Dear Mr. Richards:

This letter is to inform you that we have granted your request for exemption. It transmits our decision, explains its basis, and gives you the conditions and limitations of the exemption, including the date it ends.

By letter posted to the public docket on May 19, 2015, you petitioned the Federal Aviation Administration (FAA) on behalf of AirFrame LLC (hereinafter petitioner or operator) for an exemption. The petitioner requested to operate an unmanned aircraft system (UAS) to conduct aerial data collection and training[1].

See Appendix A for the petition submitted to the FAA describing the proposed operations and the regulations that the petitioner seeks an exemption.

The FAA has determined that good cause exists for not publishing a summary of the petition in the Federal Register because the requested exemption would not set a precedent, and any delay in acting on this petition would be detrimental to the petitioner. However, the FAA received one comment in support of the petition made to the docket.

[1] The petitioner requested authority to conduct UAS training. At this time, the FAA is unable to authorize UAS operations for training until a further assessment is completed. When the FAA completes its review, we will proceed accordingly and no further action will be required by the petitioner. However, the petitioner is permitted to train its own pilot in commands and visual observers in accordance with condition no. 14 and the other conditions and limitations in this exemption.

Airworthiness Certification

The UAS proposed by the petitioner are the DJI S800 Tarot 680PRO.

The petitioner requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates*. In accordance with the statutory criteria provided in Section 333 of Public Law 112−95 in reference to 49 U.S.C. § 44704, and in consideration of the size, weight, speed, and limited operating area associated with the aircraft and its operation, the Secretary of Transportation has determined that this aircraft meets the conditions of Section 333. Therefore, the FAA finds that the requested relief from 14 CFR part 21, *Certification procedures for products and parts, Subpart H—Airworthiness Certificates,* and any associated noise certification and testing requirements of part 36, is not necessary.

The Basis for Our Decision

You have requested to use a UAS for aerial data collection[2]. The FAA has issued grants of exemption in circumstances similar in all material respects to those presented in your petition. In Grants of Exemption Nos. 11062 to Astraeus Aerial (*see* Docket No. FAA−2014−0352), 11109 to Clayco, Inc. (*see* Docket No. FAA−2014−0507), 11112 to VDOS Global, LLC (*see* Docket No. FAA−2014−0382), and 11213 to Aeryon Labs, Inc. (*see* Docket No. FAA−2014−0642), the FAA found that the enhanced safety achieved using an unmanned aircraft (UA) with the specifications described by the petitioner and carrying no passengers or crew, rather than a manned aircraft of significantly greater proportions, carrying crew in addition to flammable fuel, gives the FAA good cause to find that the UAS operation enabled by this exemption is in the public interest.

Having reviewed your reasons for requesting an exemption, I find that—

- They are similar in all material respects to relief previously requested in Grant of Exemption Nos. 11062, 11109, 11112, and 11213;
- The reasons stated by the FAA for granting Exemption Nos. 11062, 11109, 11112, and 11213 also apply to the situation you present; and
- A grant of exemption is in the public interest.

[2] Aerial data collection includes any remote sensing and measuring by an instrument(s) aboard the UA. Examples include imagery (photography, video, infrared, etc.), electronic measurement (precision surveying, RF analysis, etc.), chemical measurement (particulate measurement, etc.), or any other gathering of data by instruments aboard the UA.

Our Decision

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in 49 U.S.C. 106(f), 40113, and 44701, delegated to me by the Administrator, AirFrame LLC is granted an exemption from 14 CFR §§ 61.23(a) and (c), 61.101(e)(4) and (5), 61.113(a), 61.315(a), 91.7(a), 91.119(c), 91.121, 91.151(a)(1), 91.405(a), 91.407(a)(1), 91.409(a)(1) and (2), and 91.417(a) and (b), to the extent necessary to allow the petitioner to operate a UAS to perform aerial data collection. This exemption is subject to the conditions and limitations listed below.

Conditions and Limitations

In this grant of exemption, AirFrame LLC is hereafter referred to as the operator.

Failure to comply with any of the conditions and limitations of this grant of exemption will be grounds for the immediate suspension or rescission of this exemption.

1. Operations authorized by this grant of exemption are limited to the DJI S800 and Tarot 680PRO when weighing less than 55 pounds including payload. Proposed operations of any other aircraft will require a new petition or a petition to amend this exemption.

2. Operations for the purpose of closed-set motion picture and television filming are not permitted.

3. The UA may not be operated at a speed exceeding 87 knots (100 miles per hour). The exemption holder may use either groundspeed or calibrated airspeed to determine compliance with the 87 knot speed restriction. In no case will the UA be operated at airspeeds greater than the maximum UA operating airspeed recommended by the aircraft manufacturer.

4. The UA must be operated at an altitude of no more than 400 feet above ground level (AGL). Altitude must be reported in feet AGL.

5. The UA must be operated within visual line of sight (VLOS) of the PIC at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate or U.S. driver's license.

6. All operations must utilize a visual observer (VO). The UA must be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC must be able to communicate verbally at all times; electronic messaging or texting is not permitted during flight operations. The PIC

must be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC must ensure that the VO can perform the duties required of the VO.

7. This exemption and all documents needed to operate the UAS and conduct its operations in accordance with the conditions and limitations stated in this grant of exemption, are hereinafter referred to as the operating documents. The operating documents must be accessible during UAS operations and made available to the Administrator upon request. If a discrepancy exists between the conditions and limitations in this exemption and the procedures outlined in the operating documents, the conditions and limitations herein take precedence and must be followed. Otherwise, the operator must follow the procedures as outlined in its operating documents. The operator may update or revise its operating documents. It is the operator's responsibility to track such revisions and present updated and revised documents to the Administrator or any law enforcement official upon request. The operator must also present updated and revised documents if it petitions for extension or amendment to this grant of exemption. If the operator determines that any update or revision would affect the basis upon which the FAA granted this exemption, then the operator must petition for an amendment to its grant of exemption. The FAA's UAS Integration Office (AFS−80) may be contacted if questions arise regarding updates or revisions to the operating documents.

8. Any UAS that has undergone maintenance or alterations that affect the UAS operation or flight characteristics, e.g., replacement of a flight critical component, must undergo a functional test flight prior to conducting further operations under this exemption. Functional test flights may only be conducted by a PIC with a VO and must remain at least 500 feet from other people. The functional test flight must be conducted in such a manner so as to not pose an undue hazard to persons and property.

9. The operator is responsible for maintaining and inspecting the UAS to ensure that it is in a condition for safe operation.

10. Prior to each flight, the PIC must conduct a pre-flight inspection and determine the UAS is in a condition for safe flight. The pre-flight inspection must account for all potential discrepancies, e.g., inoperable components, items, or equipment. If the inspection reveals a condition that affects the safe operation of the UAS, the aircraft is prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight.

11. The operator must follow the UAS manufacturer's maintenance, overhaul, replacement, inspection, and life limit requirements for the aircraft and aircraft components.

12. Each UAS operated under this exemption must comply with all manufacturer safety bulletins.

13. Under this grant of exemption, a PIC must hold either an airline transport, commercial, private, recreational, or sport pilot certificate. The PIC must also hold a current FAA airman medical certificate or a valid U.S. driver's license issued by a state, the District of Columbia, Puerto Rico, a territory, a possession, or the Federal government. The PIC must also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

14. The operator may not permit any PIC to operate unless the PIC demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency must be logged in a manner consistent with 14 CFR § 61.51(b). Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) and determining the PIC's ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption are permitted under the terms of this exemption. However, training operations may only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC must operate the UA with appropriate distance from nonparticipants in accordance with 14 CFR § 91.119.

15. UAS operations may not be conducted during night, as defined in 14 CFR § 1.1. All operations must be conducted under visual meteorological conditions (VMC). Flights under special visual flight rules (SVFR) are not authorized.

16. The UA may not operate within 5 nautical miles of an airport reference point (ARP) as denoted in the current FAA Airport/Facility Directory (AFD) or for airports not denoted with an ARP, the center of the airport symbol as denoted on the current FAA-published aeronautical chart, unless a letter of agreement with that airport's management is obtained or otherwise permitted by a COA issued to the exemption holder. The letter of agreement with the airport management must be made available to the Administrator or any law enforcement official upon request.

17. The UA may not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

18. If the UAS loses communications or loses its GPS signal, the UA must return to a pre-determined location within the private or controlled-access property.

19. The PIC must abort the flight in the event of unpredicted obstacles or emergencies.

20. The PIC is prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough available power for the UA to conduct the intended operation and to operate after that for at least five minutes or with the reserve power recommended by the manufacturer if greater.

21. Air Traffic Organization (ATO) Certificate of Waiver or Authorization (COA). All operations shall be conducted in accordance with an ATO-issued COA. The exemption holder may apply for a new or amended COA if it intends to conduct operations that cannot be conducted under the terms of the attached COA.

22. All aircraft operated in accordance with this exemption must be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N−Number) markings in accordance with 14 CFR part 45, Subpart C. Markings must be as large as practicable.

23. Documents used by the operator to ensure the safe operation and flight of the UAS and any documents required under 14 CFR §§ 91.9 and 91.203 must be available to the PIC at the Ground Control Station of the UAS any time the aircraft is operating. These documents must be made available to the Administrator or any law enforcement official upon request.

24. The UA must remain clear and give way to all manned aviation operations and activities at all times.

25. The UAS may not be operated by the PIC from any moving device or vehicle.

26. All Flight operations must be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:
    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator must ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations must cease immediately in a manner ensuring the safety of nonparticipating persons; and
    b. The owner/controller of any vessels, vehicles or structures has granted permission for operating closer to those objects and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard.

    The PIC, VO, operator trainees or essential persons are not considered nonparticipating persons under this exemption.

27. All operations shall be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative.

Permission from property owner/controller or authorized representative will be obtained for each flight to be conducted.

28. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA must be reported to the FAA's UAS Integration Office (AFS−80) within 24 hours. Accidents must be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

If this exemption permits operations for the purpose of closed-set motion picture and television filming and production, the following additional conditions and limitations apply.

29. The operator must have a motion picture and television operations manual (MPTOM) as documented in this grant of exemption.

30. At least 3 days before aerial filming, the operator of the UAS affected by this exemption must submit a written Plan of Activities to the local Flight Standards District Office (FSDO) with jurisdiction over the area of proposed filming. The 3-day notification may be waived with the concurrence of the FSDO. The plan of activities must include at least the following:
    a. Dates and times for all flights;
    b. Name and phone number of the operator for the UAS aerial filming conducted under this grant of exemption;
    c. Name and phone number of the person responsible for the on-scene operation of the UAS;
    d. Make, model, and serial or N−Number of UAS to be used;
    e. Name and certificate number of UAS PICs involved in the aerial filming;
    f. A statement that the operator has obtained permission from property owners and/or local officials to conduct the filming production event; the list of those who gave permission must be made available to the inspector upon request;
    g. Signature of exemption holder or representative; and
    h. A description of the flight activity, including maps or diagrams of any area, city, town, county, and/or state over which filming will be conducted and the altitudes essential to accomplish the operation.

31. Flight operations may be conducted closer than 500 feet from participating persons consenting to be involved and necessary for the filming production, as specified in the exemption holder’s MPTOM.

Unless otherwise specified in this grant of exemption, the UAS, the UAS PIC, and the UAS operations must comply with all applicable parts of 14 CFR including, but not limited to, parts 45, 47, 61, and 91.

This exemption terminates on August 31, 2017, unless sooner superseded or rescinded.

Sincerely,

/s/
John S. Duncan
Director, Flight Standards Service

Enclosures

Re: Exemption Request Pursuant to Section 333 of the FAA Reform Act and Part 11 of the Federal Aviation Regulations from: 14 CFR 21 subpart H; 14 CFR 61.113(a) and (b); 14 CFR 91.7(a); 14 CFR 91.103; 14 CFR 91.109; 14 CFR 91.119 (c); 14 CFR 91.121; 14 CFR 91.151(a); 14 CFR 91.405 (a); 14 CFR 91.407 (a) (1) 14 CFR 91.409 (a)(1) and (2); 14 CFR 91.417(a) and (b)

Dear Sir or Madam:

Pursuant to Section 333 of the FAA Modernization and Reform Act of 2012 (the "Reform Act") and 14 CFR Part 11, AirFrame LLC, operator of an Unmanned Aircraft System (UAS), hereby applies for an exemption from the listed Federal Aviation Regulations ("FARs") to allow commercial operation of its UAS, so long as such operations are conducted within and under the conditions outlined herein or as may be established by the FAA as required by Section 333.

Commercial operation of an UAS, as described herein, which are equipped with camera(s) and sensors, would operate in the following manner:

. Aerial photography and/or video for public and/or private use including real estate, architecture, land surveying, engineering, construction and other related professional activities.

. Aerial video and/or photography for public and/or private use including television, public events, cinematography and news gathering.

. Aerial inspection/photography of residential/commercial structures under contract with the owners or local government authority.

. Aerial inspection/photography of residential/commercial utility infrastructure including but not limited to bridges, electrical power lines, wind turbines, railways and cell towers.

. Aerial video/photography or providing live video feed to assist with search and rescue operations in cases of an emergency or natural disaster only when the local authorities or government has requested it by contract or donation.

. The ability to offer training to persons individually or belonging to both

private, public and/or government organizations that have interests in the use and application of a UAS for the purpose of the safe operation of a UAS to enhance the safety of the National Airspace System (NAS) as well as for the protection of the persons and property.

As described fully below, the requested exemption would permit the operation of a UAS under controlled conditions in the NAS that would be, limited, controlled, predetermined and will provide safety enhancements to the already safe operations in these industries presently using conventional aircraft. Approval of this exemption would thereby enhance safety and fulfill the Secretary of Transportation's (the FAA Administrator's) responsibilities to "....establish requirements for the safe operation of such aircraft systems in the national airspace system." Section 333 (c) of the Reform Act.

The name and address of the applicant is:

AirFrame LLC

Attn: Nathan W. Richards, Chief Pilot

Airline Transport Pilot Certificate: 3264269

FCC Restricted Radiotelephone Operator Permit: (FRN) 0015677990

FCC Ham Amateur Radio License Call Sign: WH6EKE

Phone: (808) 597-7959

Email: nathan@airframehi.com

Address: 5776 Haleola Street, Honolulu HI 96821

Regulations from which the exemption is requested:

14 CFR Part 21 subpart H

14 CFR 61.113 (a) & (b)

14 CFR 91.7 (a)

14 CFR 91.103

14 CFR 91.109

14 CFR 91.119 (c)

14 CFR 91.121

14 CFR 91.151 (a)

14 CFR 91.405 (a)

14 CFR 91.407 (a) (1)

14 CFR 91.409 (a) (1) & (2)

14 CFR 91.417 (a) & (b)

AirFrame LLC will operate the DJI S800 and the Tarot 680PRO, with a total AUW (all up weight) not to exceed 55lbs. The dimensions of the DJI S800 are 940mm x 940mm x 350mm or 37.6in x 37.6in x 14in. The Tarot 680PRO is 695mm x 695mm x 300mm or 27.4in x 27.4in x 11.8in. Under still air the maximum ground speed of either aircraft will not exceed 29 knots. The DJI S800 and Tarot 680PRO are VTOL (vertical take off and landing) aircraft and have the ability to hover and move along a vertical and horizontal plane simultaneously. The DJI S800 has six motors, Motor Model 4114, powered by a 6-cell 10,900 to 20,000mAh Lithium Polymer battery depending on mission type or payload requirements. There are six composite propellers, Propeller Model DJI 1552, in use. The Tarot 680PRO also has six motors, MT3506KV650, powered by a 4-cell

5,200 to 10,400mAh Lithium Polymer battery. There are six plastic propellers on the Tarot 680PRO, model APC 12x4.7SF. Both aircraft will be controlled with the FrSky Taranis X9D remote controller connected to a Dragon Link V 2.0 UHF transmitter module with an operating frequency of 433Mhz. The Dragon Link V2 (DV2 – see attached manual for additional details and information) offers a higher level of safety by exceeding transition capabilities of traditional 2.4Mhz or 5.6Mhz radio systems by several kilometers, thus ensuring extremely low lost link possibility while maintaining line of site (LOS) operations. In addition to affording superior signal at all times, DV2 also incorporates added failsafe capabilities and a downed craft locator beacon capabilities that are not available from any other radio manufacturer. The live video feeds will have an operating frequency of 5.6Mhz and 1280Mhz, that will not exceed 1 megawatt per FCC regulations. Telemetry data downlink will be transmitted in the 900Mhz band of frequency via RFD900+ Radio Modems. The RDF900+ offers redundant dual transmission diversity switched antenna with a full 1 watt transmission power ensuring zero loss of link during LOS operations. (RF900+ - see attached manual for additional details). The applicant will operate the UAS in line of sight within a closed off and predetermined area owned and/operated by the property representative as stated in the FOM.

Given the small size of the UAS and the controlled environment provided, the proposed operations will adhere to the Reform Act's safety requirements. The approval of this application presents no national security issues. Regarding the level of safety surrounding the proposed operations and the public benefit, reduction in environmental impacts, including but not limited to reduced emissions and noise. As the FAA recognized in the Douglas Trudeau, Exemption, No. 11138: "Manned aircraft conducting aerial filming and photography can weigh 5,000 lbs. or more, are operated by an onboard pilot and may carry other onboard crew members, as well as 100 gallons or more of fuel. The petitioner's [sUAS] weighs less than 3 lbs. The pilot and crew will be remotely located from the aircraft. The limited weight reduces the potential for harm to persons or damage to property in the event of an incident or accident. The risk of an onboard pilot and crew during an incident or accident is eliminated with the use of a [sUAS] for the proposed operation."

AIRCRAFT AND EQUIVALENT LEVEL OF SAFETY

The operation limitations proposed for an equivalent or higher level of safety because operations will further enhance the safety of the persons and/or property using conventional aircraft.

These limitations and conditions to which the applicant agrees to adhere to when conducting commercial operations under the FAA issued exemption as set forth in the Flight Operations Manual (FOM) include:

1. The UAS will weigh less than 55 lbs.

2. The UAS will have a maximum operating speed of no more than 15m/s or 29 knots.

3. The UAS will be operated at an altitude of no more than 400 feet above ground level (AGL). All altitudes reported to ATC will be in feet AGL.

4. The UAS will be operated within visual line of sight (VLOS) of the pilot in command (PIC) at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses, as specified on the PIC's FAA-issued airman medical certificate.

5. All operations will utilize a visual observer (VO). The UAS will be operated within the visual line of sight (VLOS) of the PIC and VO at all times. The VO may be used to satisfy the VLOS requirement as long as the PIC always maintains VLOS capability. The VO and PIC will be able to communicate verbally at all times. Electronic messaging or texting will not be permitted during flight operations. The PIC will be designated before the flight and cannot transfer his or her designation for the duration of the flight. The PIC will ensure that the VO can perform the functions prescribed in the FOM.

6. The VO will not perform any other duties beyond assisting the PIC with seeing and avoiding other air traffic and other ground based obstacles/obstructions, and is will not be permitted to operate the camera or other instruments.

7. The FOM and this grant of exemption will be accessible during

UAS operations and made available to the Administrator upon request.

8. Prior to each flight, the PIC will inspect the UAS to ensure it is in a condition for safe flight. If the inspection reveals a condition that affects the safe operation of the UAS, the UAS will be prohibited from operating until the necessary maintenance has been performed and the UAS is found to be in a condition for safe flight. The Ground Control Station will be included in the preflight inspection. All maintenance and alterations will be properly documented in the aircraft records

9. If the UAS has undergone maintenance or alterations that affect the UAS operation or flight characteristics (e.g. replacement of a flight critical component) it will undergo a functional test flight. The PIC who conducts the functional test flight will make an entry in the aircraft records.

10. The PIC will possess at least a private pilot airman certificate and at least a current third class medical certificate. The PIC will also meet the flight review requirements specified in 14 CFR § 61.56 in an aircraft in which the PIC is rated on his or her pilot certificate.

11. AirFrame LLC will not permit any PIC to operate unless the PIC meets AirFrame LLC's qualification criteria and demonstrates the ability to safely operate the UAS in a manner consistent with how the UAS will be operated under this exemption, including evasive and emergency maneuvers and maintaining appropriate distances from persons, vessels, vehicles and structures. PIC qualification flight hours and currency will be logged in a manner consistent with 14 CFR § 61.51(b). The PIC will ensure that the VO is trained appropriately in order to fulfill her or her duties. A record of training will be documented and made available upon request by the Administrator. Flights for the purposes of training the operator's PICs and VOs (training, proficiency, and experience-building) will only be conducted during dedicated training sessions. During training, proficiency, and experience-building flights, all persons not essential for flight operations are considered nonparticipants, and the PIC will operate the UA with appropriate distance from nonparticipants in accordance with 14

CFR § 91.119.

12. UAS operations will not be conducted during night, as defined in 14 CFR § 1.1. All operations will be conducted under visual meteorological conditions (VMC).

13. The UA will not operate within 5 nautical miles of an airport reference point as denoted on a current FAA-published aeronautical chart unless a letter of agreement with that airport's management is obtained, and the operation is conducted in accordance with a Notice to Airmen (NOTAM), as required by the operator's Certificate of Waiver or Authorization (COA). The letter of agreement with the airport management will be made available to the Administrator upon request.

14. The UA will not be operated less than 500 feet below or less than 2,000 feet horizontally from a cloud or when visibility is less than 3 statute miles from the PIC.

15. If the UA loses communications or loses its GPS signal, it will return to a pre- determined location within the planned operating area and land or be recovered in accordance with the FOM.

16. The PIC will abort the flight in the event of unpredicted obstacles or emergencies in accordance with FOM

17. The PIC will be prohibited from beginning a flight unless (considering wind and forecast weather conditions) there is enough power to fly at normal cruising speed to the intended landing point and land the UAS with 25% battery power remaining.

18. The operator will obtain an Air Traffic Organization (ATO) issued COA prior to conducting any operations under this grant of exemption. This COA will require the operator to request a NOTAM not more than 72 hours in advance, but not less than 48 hours prior to the operation. All operations will be conducted in accordance with airspace requirements in the ATO issued COA including class of airspace, altitude level and potential transponder requirements.

19. The UAS will be identified by serial number, registered in accordance with 14 CFR part 47, and have identification (N-Number) markings in accordance with 14 CFR part 45, Subpart C. Markings will be as large as practicable.

20. Before conducting operations, the radio frequency spectrum used for operation and control of the UA will comply with the Federal Communications Commission (FCC) or other appropriate government oversight agency requirements.

21. The operator will keep a copy of the UAS manufacturer's operating/flight manual and all other operating documents in a location accessible to the PIC, during flight operations. These documents will be made available to the Administrator or any law enforcement official upon request.

22. The UAS will remain clear and yield the right of way to all other aviation operations and activities at all times

23. The UAS will not be operated by the PIC from any moving device or vehicle

24. Flight operations will be conducted at least 500 feet from all nonparticipating persons, vessels, vehicles, and structures unless:

    a. Barriers or structures are present that sufficiently protect nonparticipating persons from the UA and/or debris in the event of an accident. The operator will ensure that nonparticipating persons remain under such protection. If a situation arises where nonparticipating persons leave such protection and are within 500 feet of the UA, flight operations will cease immediately and/or;

    b. The aircraft is operated near vessels, vehicles or structures where the owner/controller of such vessels, vehicles or structures has granted permission and the PIC has made a safety assessment of the risk of operating closer to those objects and determined that it does not present an undue hazard, and;

c. Operations nearer to the PIC, VO, operator trainees or essential persons do not present an undue hazard to those persons per § 91.119(a).

25. All operations will be conducted over private or controlled-access property with permission from the property owner/controller or authorized representative. Permission from property owner/controller or authorized representative will be obtained prior to the beginning of every flight.

26. Any incident, accident, or flight operation that transgresses the lateral or vertical boundaries of the operational area as defined by the applicable COA will be reported to the FAA's UAS Integration Office (AFS-80) within 24 hours. Accidents will be reported to the National Transportation Safety Board (NTSB) per instructions contained on the NTSB Web site: www.ntsb.gov.

14 C.F.R. Part 21, Subpart H: Airworthiness Certificates 14 C.F.R. §91.203 (a) (1)

Subpart H, entitled Airworthiness Certificates, establishes the procedural requirements for the issuance of airworthiness certificates as required by FAR §91.203 (a) (1). Given the size and limited operating area associated with the aircraft to be utilized by the Applicant, an exemption from Part 21 Subpart H meets the requirements of an equivalent level of safety under Part 11 and Section 333 of the Reform Act. The Federal Aviation Act (49 U.S.C.§44701 (f)) and Section 333 of the Reform Act both authorize the FAA to exempt aircraft from the requirement for an airworthiness certificate, upon consideration of the size, weight, speed, operational capability, and proximity to airports and populated areas of the particular UAS. In all cases, an analysis of these criteria demonstrates that the UAS operated without an airworthiness certificate, in the restricted environment and under the conditions proposed will be at least as safe, or safer, than a conventional aircraft (fixed wing or rotorcraft) operating with an airworthiness certificate without the restrictions and conditions proposed.

The UAS to be operated is less than 55 lbs. fully loaded, carries neither a pilot nor passenger, carries no explosive materials or flammable liquid fuels, and operates exclusively within a secured and designated area. Unlike other civil aircraft, operations under this exemption will be tightly

controlled and monitored by both the operator and under the requirements and in compliance with local public safety requirements. The FAA will have advance notice of all operations. These safety enhancements provide a greater degree of safety to the public and property owners than conventional operations conducted with airworthiness certificates issued under 14 C.F.R. Part 21, Subpart H. Lastly, application of these same criteria demonstrates that there is no credible threat to national security posed by the UAS, due to its size, speed of operation, location of operation, lack of explosive materials or flammable liquid fuels, and inability to carry a substantial external load.

14 C.F.R. § 61.113 (a) and (b): Private Pilot Privileges and Limitations: Pilot in Command

Pursuant to 14 CFR 61.113 (a) & (b), no person who holds a private pilot certificate may act as a pilot in command of an aircraft that is carrying passengers or property for compensation or hire. AirFrame LLC may achieve an equivalent level of safety as achieved by current Regulations because the applicant's UAS do not carry any pilots or passengers nor property. The risks attendant to the operation of UAS is far less than the risk levels inherent in the commercial activities outlined in 14 CFR 61. The PIC of the UAS will have a Commercial Pilot's License along with a current Second Class or higher Medical exceeding the current safety levels in relation to 14 CFR 61.113 (a) & (b)

14 C.F.R. §91.7(a): Civil Aircraft Airworthiness

The regulation requires that no person may operate a civil aircraft unless it is in airworthy condition. As there will be no airworthiness certificate issued for the aircraft, should this exemption be granted, no FAA regulatory standard will exist for determining airworthiness. Given the size of the aircraft for maintenance and use of safety checklists prior to each flight and procedures outlined in the FOM and user's manuals, an equivalent level of safety will be provided.

14 C.F.R. § 91.103: Preflight Action

This regulation requires each pilot in command to take certain actions before flight to insure the safety of flight. As FAA approved rotorcraft flight manuals will not be provided for the aircraft an exemption will be needed. The PIC will take all actions as stated in the FOM under Normal Procedures including but not limited to reviewing weather, flight battery requirements, and aircraft performance data before initiation of flight.

14 C.F.R. §91.109: Flight Instruction

Section 91.109 provides that no person may operate a civil aircraft (except a manned free balloon) that is being used for flight instruction unless that aircraft has fully functioning dual controls. UAS and remotely piloted aircraft, by their design do not have fully functional dual controls. Flight control is accomplished through the use of a control box that communicates with the aircraft via radio communications. The FAA has approved exemptions for flight training without fully functional dual controls for a number of aircraft and for flight instruction in experimental aircraft. The equivalent level of safety is provided by the fact that neither a pilot nor passengers will be carried in the aircraft and by the size and speed of the aircraft. Details of AirFrame LLC's required flight instruction are included in the FOM.

14 C.F.R. §91.119(c): Minimum Safe Altitudes

Section 91.119 establishes safe altitudes for operation of civil aircraft and states that "except when necessary for takeoff or landing, no person may operate an aircraft below the following altitudes: .....

(c) Over other than congested areas. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure."

Because AirFrame LLC requests authority to operate at altitudes only up to 400 AGL, an exemption is needed to allow such operations. The UAS will never operate higher than 400 AGL. It will, however, be operated in a

restricted area within a security perimeter, where buildings and people will not be exposed to operations without their pre-obtained consent.

The equivalent level of safety will be achieved given the size, weight, and speed of the UAS as well as the location where it is operated. No flight will be taken without the permission of property owners or local officials. Because of the advance notice to the property owners and participants in the filming activity, all affected individuals will be informed of the planned flight operations. Compared to flight operations for manned aircraft and the lack of flammable fuel, any risk associated with the proposed UAS operations is far less than conventional aircraft operating at or below 500 AGL. In addition, the low-altitude operations of the UAS will ensure separation between a UAS and conventional aircraft.

14 C.F.R. §91.121 Altimeter Settings.

This regulation requires each person operating an aircraft to maintain cruising altitude by reference to an altimeter that is set "...to the elevation of the departure airport or an appropriate altimeter setting available before departure." As the UAS may not have a barometric altimeter, but instead a GPS altitude read out, an exemption may be needed. An equivalent level of safety will be achieved by the operator, pursuant to FOM procedures and live flight data monitoring, confirming the altitude of the launch site shown on the GPS altitude indicator before flight. All altitudes will be reported to ATC in feet Above Ground Level (AGL).

14 C.F.R. § 91.151(a): Fuel Requirements for Flight in VFR Conditions

Section 91.151 (a) prohibits an individual from beginning "a flight in an airplane under VFR conditions unless (considering wind and forecast weather conditions) there is enough fuel to fly to the first point of intended landing, and, assuming normal cruising speed – (1) During the day, to fly after that for at least 30 minutes; or (2) At night, to fly after that for at least 45 minutes."

The battery powering the UAS provides approximately 30 minutes of

powered flight. To meet the 30 minute reserve requirement in 14 CFR §91.151, UAS flights would be limited to approximately 10 minutes in length. Given the limitations on the UAS's proposed flight area and the location of its proposed operations within a predetermined area, a longer time frame for flight in daylight or twilight VFR conditions is reasonable.

AirFrame LLC believes that an exemption from 14 CFR §91.151(a) falls within the scope of prior exemptions. Operating the UAS, in a tightly controlled area, with less than 30 minutes of reserve fuel, does not engender the type of risks that Section 91.151(a) was intended to alleviate given the size and speed of the small UAS. Additionally, limiting UAS flights to 10 minutes would greatly reduce the utility for which the exemption will be granted. AirFrame LLC believes that an equivalent level of safety can be achieved by limiting flights to 75% battery, ensuring the UA lands with at least 25% battery charge remaining. This restriction would be more than adequate to return the UAS to its planned landing zone from anywhere in its limited operating area.

14 C.F.R. §91.405 (a); 407 (a) (1); 409 (a) (2); 417(a) & (b): Maintenance Inspections

These regulations require that an aircraft operator or owner "shall have that aircraft inspected as prescribed in subpart E of this part and shall between required inspections, except as provided in paragraph (c) of this section, have discrepancies repaired as prescribed in part 43 of this chapter...," and others shall inspect or maintain the aircraft in compliance with Part 43.

Given that these section and Part 43 apply only to aircraft with an airworthiness certificate, these sections will not apply to the applicant. Maintenance actions will be accomplished by the operator pursuant to the FOM and the user's manuals. An equivalent level of safety will be achieved because the UAS is very limited in size and will carry a small payload and operate only in restricted areas for a limited period of time. If mechanical issues arise the UAS can land immediately and will be operating from no higher than 400 feet AGL. The operator will ensure that the UAS is in working order prior to initiating flight, perform required maintenance, and keep a log of any maintenance performed. Moreover, the operator is the person most familiar with the aircraft and best suited to maintain the

aircraft in an airworthy condition to provide the equivalent level of safety.

An equivalent level of safety will be achieved because maintenance and inspections will be performed in accordance with the UAS Manufacturer's User Manual. As provided in the FOM and the user's manuals, the operator will ensure that the UAS is in working order prior to initiating flight and perform required maintenance needed.

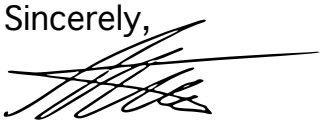
CONCLUSION

Approval of exemptions allowing commercial operations of UASs will enhance safety by reducing risk. Conventional operations, using jet or piston power aircraft, operate at extremely low altitudes just feet from the subject being observed and in extreme proximity to people and structures; and present the risks associated with vehicles that weigh in the neighborhood of 4,000lbs., carrying large amounts of jet A or other fuel (140 gallons for jet helicopters). Such aircraft must fly to and from the inspection site. In contrast, a UAS weighing fewer than 55 lbs. and powered by batteries eliminates virtually all of that risk given the reduced mass and lack of combustible fuel carried on board. The UAS is carried to the operational site. The UAS will carry no passengers or crew and, therefore, will not expose them to the risks associated with manned aircraft flights. I, the Chief Pilot at AirFrame LLC, have close to 8 years experience flying remote controlled (RC) aircraft and over 15 years experience flying turbojet commercial aircraft for major commercial carriers internationally. I fully understand the safety concerns of the general public and aviation industry. AirFrame LLC will adhere to all FAR's and maintain an Equivalent Level Safety, or better, during all operations.

Please find attached:
- Flight Operations Manual (FOM)*
- Pixhawk/APM User's Manual
- Dragon Link User's Manual
- Taranis User's Manual
- RFD900 Data Sheet
- S800 User's Manual
- Tarot 680 Pro Specifications

*Applicant submits this Flight Operations Maunal (FOM) as a Confidential document under 14 CFR 11.35 (b) as the entire FOM contains proprietary information that the applicant has not and will not share with others. The manual contains operating conditions and procedures that are not available to the public and are protected from release under the Freedom of Information Act 5 USC 552 et.seq.

Sincerely,



Nathan W. Richards